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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/665,940	09/21/2000	Chishio Koshimizu	07553.0008	8913

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

8

DATE MAILED: 08/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/665,940

Applicant(s)

KOSHIMIZU ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 12-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____.

DETAILED ACTION

Claim R jections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 12, 14, 16, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Moriya et al. (US 5,494,522).

Moriya teaches a plasma processing method that comprises:

A lower electrode **308** is arranged in etching chamber **301** and the wafer **W** is mounted on the lower electrode **308** (column 10, lines 58-59), which reads on,

a step in which a workpiece is placed at a mount surface of an electrode provided inside a plasma processing chamber.

High frequency voltage is added between the upper **314** and the lower electrode **408** (column 12, lines 7-8). This voltage is analogous to the DC voltage that is added from a high voltage DC power source **10** and **63** (column 3, lines 4-9; column 4, lines 50-54; and column 8, lines 1-5) in Figures **1** and **2** and is used to attract and hold wafer **W** on the top of the electrostatic chuck **8**. Hence, the aforementioned reads on,

a step in which said workpiece is vacuum-held by applying a high level DC voltage to an electrostatic chuck provided at said mounting surface of said electrode.

Operating the etching process system wherein the vacuum process chamber **301** is set at 10^{-6} Torr (column 11, lines 51-57) reads on,

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a step in which plasma processing is performed on said workpiece under a reduced pressure atmosphere.

Moriya teaches "The gate valve **306** of the auxiliary vacuum chamber **302** which is under normal pressure is opened and the carrier unit **317** is extended to the auto-loader **318** through the opening **305** to carry the wafer **W** from the auto-loader **318** into the auxiliary vacuum chamber **302**. The gate valve **306** is closed and the auxiliary vacuum chamber **302** is exhausted vacuum through the exhaust pipe **319**. The gate valve **304** is opened to communicate the vacuum (reduced pressure) process chamber **301** with the auxiliary vacuum one **302**" (column 11, lines 54-62), which reads on,

a step of sustaining a gas inside a delivery chamber at a higher pressure than said reduced pressure atmosphere; and

a step of opening a means for opening/closing which switchably connects said delivery chamber to said plasma processing chamber for transfer of said workpiece from/to said plasma processing chamber, wherein said step of opening introduces said gas from inside said delivery chamber into said plasma processing chamber.

Since Moriya uses the same apparatus and method of transporting a wafer and gas from an auxiliary vacuum chamber (same as applicant's delivery chamber) to a process chamber (same as applicant's plasma processing chamber) then using Moriya's method of opening a means for opening/closing that connects the delivery chamber to the plasma chamber for transfer of said workpiece from/to said plasma processing chamber, would inherently introduce said gas from inside said delivery

chamber into said plasma processing chamber before said electrode reaches said delivery position.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya ('522) as applied to claim 12 above, and further in view of Dornfest et al. (US 5,779,807).

Moriya differs in failing to teach a step in which a reverse high DC voltage is applied to said electrostatic chuck is until immediately after said means for opening/closing is opened, the voltage having a reverse polarity from the polarity of said high level DC voltage applied to said electrostatic chuck while said electrostatic chuck is vacuum-holding said workpiece.

Dornfest teaches applying a bias voltage includes applying an alternating voltage (that alternates in polarity, see Abstract), whereby both positively-charged and negatively charged particulates will be launched from semiconductor wafer and ranges from 100 volts to 2,000 volts (column 2, lines 15-20 and 44-49), which reads on a step in which a reverse high level DC voltage is applied to an electrostatic chuck and the voltage having a reverse polarity from the polarity of said high level DC voltage.

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It would have been obvious to modify Moriya's by employing a high reverse DC voltage to an electrostatic chuck as taught by Dornfest until immediately after said means for opening/closing is opened for the purpose of removing charged particles from an electrostatic chuck.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya (US 5,779,807) as applied to claim 12 above.

Moriya differs in failing to teach the pressure inside said delivery chamber and the pressure inside said plasma processing chamber are set roughly equal to each other after said means for opening/closing is opened, **in claim 14**.

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to set the pressure inside the delivery chamber to be roughly equal to the pressure inside the processing chamber as desired for the purpose of preventing harmful gases from flowing one chamber into the next chamber.

6. Claims 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriya ('522).

Moriya teaches a plasma processing method that comprises:

A lower electrode **308** is arranged in etching chamber **301** and the wafer **W** is mounted on the lower electrode **308** (column 10, lines 58-59), which reads on,

a step in which a workpiece is placed at a mount surface of an electrode provided inside a plasma processing chamber.

High frequency voltage is added between the upper **314** and the lower electrode **408** (column 12, lines 7-8). This voltage is analogous to the DC voltage that is added from a high voltage DC power source **10** and **63** (column 3, lines 4-9; column 4, lines 50-54; and column 8, lines 1-5) in Figures **1** and **2**) and is used to attract and hold wafer **W** on the top of the electrostatic chuck **8**. Hence, the aforementioned reads on,

a step in which said workpiece is vacuum-held by applying a high level DC voltage to an electrostatic chuck provided at said mounting surface of said electrode;

operating the etching process system wherein the vacuum process chamber **301** is set at 10^{-6} Torr (column 11, lines 51-57), reads on,

a step in which plasma processing is performed on said workpiece under a reduced pressure atmosphere; and

Moriya teaches "The gate valve **306** of the auxiliary vacuum chamber **302** which is under normal pressure is opened and the carrier unit **317** is extended to the auto-loader **318** through the opening **305** to carry the wafer **W** from the auto-loader **318** into the auxiliary vacuum chamber **302**. The gate valve **306** is closed and the auxiliary vacuum chamber **302** is exhausted vacuum through the exhaust pipe **319**. The gate valve **304** is opened to communicate the vacuum process chamber **301** with the auxiliary vacuum chamber **302**" (column 11, lines 54-62), which reads on,

a step of sustaining a gas inside a delivery chamber at a higher pressure than said reduced pressure atmosphere; and

a step of opening a means for opening/closing which switchably connects said delivery chamber to said plasma processing chamber for transfer of said workpiece

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from/to said plasma processing chamber, wherein said step of opening introduces said gas from inside said delivery chamber into said plasma processing chamber.

Moriya differs in failing to teach wherein said step of opening introduces said gas from inside said delivery chamber into said plasma processing chamber after said plasma processing is completed, in claim 18.

It would have been obvious to introduce gas from inside a delivery chamber into a plasma-processing chamber after the plasma processing is completed for the purpose of removing unwanted impurities that would cause defects on a semiconductor wafer.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

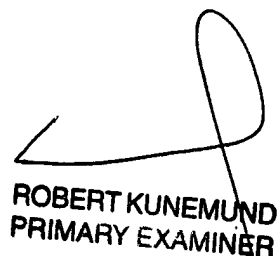
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-972-9311 for After Final communications.

ltue
August 28, 2002



ROBERT KUNEMUND
PRIMARY EXAMINER